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HULL ROYAL INSTITUTION.



THE
ANNUAL REPORT

OF THE
COUNCIL
AND
TRANSACTIONS

OF THE
Hull Literary and Philosophical Society

FOR THE
SESSION 1876—1877.

HULL:
"EASTERN MORNING NEWS" OFFICE, 42, WHITEFRIARGATE.

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FIFTY-FOURTH ANNUAL GENERAL MEETING
OF THE
Hull Literary & Philosophical Society,

Held at the Royal Institution, 4th May, 1877.

Dr. Rollit, President of the Society, in the Chair.



THE Minutes of the last Annual General Meeting were read, after which the President read the Report of the Council as follows :—

The Council are glad that the financial state of the Society is exceedingly satisfactory. Upon this subject the report of last Session stated that "caution was required," and that "taking the most favourable view, it was clear that no large margin separated the ordinary receipts and expenditure, and that the incoming Council would have to exercise a vigilant care with regard to the finances." The Council have acted upon this principle, and, as the result, the Treasurer's report shows that not only has the balance owing to the bank upon the account of last year—£63 12s. 4d.—been paid, but that, at the close of the Session, the balance in hand amounts to £256 16s. 11d., the income of the year having exceeded the expenditure by £322 19s. 3d.; while £600 remains as capital invested in debentures of the Hull Dock Company, bearing interest at $4\frac{1}{4}$ per cent.; and the Institution is under no appreciable liability whatever. The increase in the income of the Society is chiefly attributable to the large additions which have been made to the number of the Members during the past year, no less than six life and 172 ordinary Members having been elected. The total number of Members and Subscribers is now 566, a figure very greatly in excess of that at any previous period in the history of the Society.

The following Syllabus of Lectures was issued at the commencement of the Session, and has been attended by nearly 8,000 Members and their friends, the interest in this department of the Institution having considerably increased:—

A. K. ROLLIT, LL.D., B.A.—“Introductory Address.”

R. A. PROCTOR, B.A., F.R.A.S., Secretary of the Royal Astronomical Society.
—“The Giant Planets—a Study of the Condition of Saturn and Jupiter.”
—(Illustrated with the Oxy-hydrogen Light).

HENRY CHARLTON BASTIAN, M.D., F.R.S., F.L.S.—“The Nature and Origin of Living Matter.”

J. G. MCKENDRICK, M.D., F.R.S.E.—“Musical Sounds.”—(With Experiments.)

The Rev. MAURICE DAVIES, LL.D.—“Fam—Ancient and Modern.”—(With Illustrative Readings.)

Commander V. L. CAMERON, R.N., C.B.—“My Journey Across Central Africa.”

Commander V. L. CAMERON, R.N., C.B.—“My Journey Across Central Africa.”

ARTHUR ARNOLD, M.A.—“Eastern Life and Manners.”

F. A. BEDWELL, M.A., F.R.M.S.—“A Little Science goes a Long Way.”

SIR WILLIAM THOMSON, LL.D., D.C.L., F.R.S.—“The Mariner’s Compass.”

W. H. and Mrs. KENDAL (Miss Madge Robertson)—“Readings from Shakespeare and other Poets.”

SIR H. DRYDEN, Bart., F.S.A.—“The Architectural Remains at Wisby in Sweden.”

Captain MORESBY, R.N.—“My Discoveries in New Guinea.”

JOHN MURRAY, of the Scientific Staff of H.M.S. Challenger.—“The Cruise of the Challenger.”

J. H. GIBSON, M.D., V.P.—“The Music of Handel, Haydn, Mozart, and Mendelssohn compared.”—(With Musical Illustrations).

HENRY MORLEY, Professor of English Literature, University College, London.
—“Spenser’s Faerie Queene.”

HENRY MORLEY—“Novels, Old and New.”

HENRY MORLEY—“Present Tendencies of English Literature.”

W. CHAPPELL, F.S.A.—“The Science and Principles of Music.”—(With Illustrations).

The Rev. ISAAC TAYLOR, M.A.—“A. B. C.”

The Rev. SAMUEL HAUGHTON, M.D., D.C.L., F.R.S.—“The Laws which regulate Muscular Work and Fatigue.”

The whole of the engagements in the syllabus have been fulfilled, with the exception of the readings by Mr. and Mrs. Kendal, which have been necessarily postponed owing, the Council regret, to Mrs. Kendal’s illness. The Lecturers have, as a rule, been very eminent literary and scientific authorities, while the subjects of their addresses have been of the greatest immediate interest, including the journey of Captain Cameron across Central Africa, the Voyage of the

Challenger, and the Nature and Origin of Living Matter. The syllabus also included a free lecture to the working classes, by Captain Cameron, which was attended by a very large artisan audience, who manifested the greatest appreciation of the opening of the doors of the Institution to their class. To the whole of the above gentlemen, but especially to Judge Bedwell, Sir William Thompson, Sir H. Dryden, Captain Moresby, W. Chappell, Esq., the Rev. I. Taylor, Dr. J. H. Gibson, V.P., and the President, who have given Honorary Lectures, the Council feel that the Members are under a very deep obligation, and they take this opportunity of conveying their thanks to those who have rendered such material assistance to the Institution.

The year has been marked by the first course of "Science Lectures for the People," under the Gilchrist Trust, the syllabus of which was as follows :—

Professor P. A. DUNCAN, M.D., F.R.S.—"The Energies within the Earth—Volcanoes."

R. A. PROCTOR, Esq., B.A., F.R.A.S.—* "The Moon."

Dr. CARPENTER, C.B., F.R.S., F.G.S., F.L.S., &c.—"Life on the Deep Sea Bottom—Formation of Chalk"

Dr. CARPENTER—* "A Piece of Limestone."

Mr. PROCTOR—* "Planets, Comets, and Meteorites."

NORMAN LOCKYER, Esq., F.R.S.—* "The Chemistry of the Sun."

The Lectures marked (*) were illustrated by the oxy-hydrogen lantern. The admission to these lectures was a penny, and on each occasion the room was densely crowded, the total number admitted being between 4,000 and 5,000, and the highest number on any one evening 847. The receipts amounted to £18 0s. 4d., leaving a clear profit to the Society of £5 15s. 8d., after deducting the expense of printing, advertising, &c. The whole of the Lectures were evidently highly appreciated by the working classes, of whom the audiences were entirely composed, and the result indicates most clearly that it is not a difficult task to enlist the interest and sympathies of artisans and their families in Lectures of a high class. The Council feel that the work done in this direction has been exceedingly valuable, not only from a scientific, but also from a social and moral, point of view : and while they acknowledge their obligations to Dr. Carpenter and

the Trustees of the Gilchrist Fund, they also hope that it may be found possible to secure the delivery of a similar course during the next winter, and even to extend this useful movement.

The interest of the working classes in Lectures and Entertainments of a high character is also shown by the largely increased attendance at the Museum and Lectures on "Saturday Afternoons." The receipts from this source have increased from £35 7s. 11d. last year, to upwards of £55, while about 14,000 persons have been admitted, the attendance during the last six months having been double that of the same preceding period. The Council acknowledge their indebtedness to those who have delivered Lectures and given Readings from standard authors, namely :—Mr. C. S. Todd, F.S.A., Dr. King (the Mayor), Messrs. B. Carlill, T. Farrell, B.A., J. Savage, C. Judge, B. Batigan, M. B. Spurr, J. L. Jacobs, R. H. B. Nicholson, M.R.C.S., Dr. Macmillan, Dr. Gibson, Mr. R. L. Seaton, B.A., Rev. H. L. Clarke, M.A., Messrs. W. H. Jones, J. P. Nash, M.A., T. M. Evans, M.R.C.S., E. P. Hardey, M.R.C.S., T. Rowney, L.D.S., M. W. Whitfield, M.A., Dr. Bell, Messrs. T. Walton, F.C.S., H. Rose, Z. Scaping, J. C. Niven, A. K. Rollit, James Baynes, F.C.S., J. B. Willows, J. S. Haydon, J. A. Bulmer, Captain Moresby, R.N., and Messrs. J. S. Harrison, and Russell Starr. The Council also thank Mr. R. M. Craven, V.P., who has repeated his subscription of five guineas to this department of the Institution ; and Mr. James Baynes, jun., the Borough Analyst, for his ready assistance in the illustration of several Lectures by the oxy-hydrogen light.

The Science Classes have been attended by 139 students, being a slight decrease upon the attendance of last year, and the Council feel that this branch of the Society's operations may well be developed, the teaching powers and resources of the Institution being adequate to a much greater work, and the principle of systematic scientific instruction being one which the Members must most cordially approve. The Prizes and Certificates given by the Science and Art Department, of the former of which 32, and the latter 119, were obtained by the students in the classes, were distributed at the commencement of the Session by the President, at a meeting which was largely attended, and which was subsequently addressed by Sir Henry Cooper

and Mr. Craven, and also by Mr. J. L. Jacobs, who has rendered most efficient assistance in this and other departments of the Institute during the illness of Mr. Harrison, and who has thus earned the thanks of the Society. The prize-takers included Mr. J. W. B. Wright, pattern maker, who has distinguished himself, and reflected honour upon the Institution and the town, by gaining one of the Whitworth Scholarships of £100 a year.

In order to encourage Technical Education, the Institution has been placed in connection with the Society of Arts, whose technological examinations will, in future, be held in the Royal Institution, when prizes for proficiency in various branches of industry may be competed for by artisans. The Council trust that candidates will present themselves, and they feel the desirability of making this feature of the Institution widely known among the working classes, and of inducing, for material, social, and moral reasons, the artisans of Hull to take an interest in the subject of technical and industrial instruction.

The Museum has received several additions during the year. The President has addressed to the shipowners and shipmasters of the port a special letter inviting their assistance in procuring objects from abroad—a source from which much benefit ought to be derived; and a promise has been made, through Mr. Murray, of the Challenger Expedition, who lectured to the Society during the Session, that when the objects collected during the voyage are distributed our Museum shall participate. The Council have specially to thank Mr. Murray for this promise, and for the gift of one or two objects; Mr. R. M. Craven for his presentation of a collection of crag fossils; and other donors; and they trust that many more donations may be received, and especially such as will give to the Museum a locally representative character—a leading principle on which, in their opinion, provincial Museums should be chiefly formed.

The Council desire to draw the special attention of the Members to a proposal which has recently been made by Dr. Longstaff, and which has been most readily and thankfully accepted. Dr. Longstaff, who has been one of the earliest friends of the Institution, and most untiring in his interest and liberality towards it, having purchased for £690 two houses in Waltham-street, adjoining the Institution,

has agreed to re-sell them to the Society for £500, which it is intended to provide out of the invested funds. By this means rentals will be received which will render the outlay in itself a highly remunerative investment, while the opportunity will be afforded of enlarging, at any future time, the premises of the Society by the addition of Science class-rooms or otherwise—a step which will be enforced upon the Society by the extension of the teaching and other departments of the Institution.

This addition to the property of the Institute will also facilitate the realisation of the hope of the Council that at no distant day the Royal Institution will become a collegiate building devoted to literary and scientific instruction of the highest class, and the great intellectual centre of our town and district—an object which must sooner or later enlist the sympathy, energy, and sacrifice of all those who desire the intellectual, moral, and material advancement of Hull. Actuated by these views, the Council have in contemplation a course of Lectures by Dr. W. B. Richardson, F.R.S., on “Physiology,” and they have also had under their serious consideration the question of providing for the delivery of University Lectures in Hull on literature, history, science, and other subjects, under the direction of a resident teacher, devoting all his time to higher education; and they recommend the adoption, on terms to be mutually agreed upon by the incoming Council and the University Extension Committee, of the University Extension movement, and its amalgamation with the other operations of the Society, so far as this can be done consistently with the primary objects and laws of the Institution, and without an undue limitation of the work of other departments.

In conclusion, the Council have to thank Mrs. Thomas Earle for the gift of two of her late husband's works, “Alexander Mounting Bucephalus,” and “Genius Receiving the Reward of Merit,” works which will be an artistic ornament to the Society's building, and honourable monuments of a townsman's skill as a sculptor, and which may, it is to be hoped, foreshadow the formation of an art gallery as a department of the Institution; the local press, for its ready and constant assistance; and lastly, and especially, the Honorary Secretaries, Messrs. Harrison and Cook, who retire from office after so

many years of valuable service to the Society, and who are entitled to the most hearty thanks of both the Council and the Members.

The Mayor (Dr. King) moved the adoption of the Report. He remarked that the Society might be said to have thrown off its pupillage, and to have entered upon the task which he had always considered set before it, as the principal instructor of the adult population of the town. He alluded to the Science Class Lectures for the people, as affording instruction to the artisan class; and to the Cambridge University Extension scheme, which had already been established a year; but felt that, while they were visited merely by itinerant lecturers, so to speak, they had not that permanent hold of the Universities which a town of the importance of Hull required. The scheme before them involved, probably, the residence amongst them of a Cambridge University man, who would necessarily be a local leader in all educational movements, and should be an ex-officio member of the Society. He cordially recommended the adoption of the Report, adding that, as the Mayor, and representative of the Corporation and the town, he considered that the Society was doing a great work for the inhabitants of the place, and he hoped the inhabitants would show their appreciation of it by joining the Society in still larger numbers.

Mr. Dale Brown seconded the motion, which was unanimously agreed to.

The Treasurer's Account having been taken as read, Mr. Dossor moved, and Mr. Micks seconded, that it be adopted; and the motion was carried.

Mr. Hanwell moved, and Mr. Woodhouse seconded, a vote of thanks to the retiring Officers and Council, which was at once agreed to.

Mr. Craven moved, and Mr. Dossor seconded, a vote of thanks to the President for his very valuable and efficient services to the Society during the past year, which was carried by acclamation.

The Mayor moved a special vote of thanks to the retiring Secretaries, Mr. R. Harrison and Mr. R. L. Cook, and spoke of the extraordinary services of Mr. Harrison, extending over a period of twenty years, during part of which time he acted also as Honorary

Curator, thus saving the Society a very considerable expense. He thought, under the circumstances, they could not allow Mr. Harrison to retire without giving some substantial evidence of their appreciation of his services, and gave notice of his intention to ask the Council to call a special meeting to consider the subject. The vote of thanks was seconded by Sir H. Cooper and carried. The Mayor then proposed that it be a recommendation to the incoming Council that Mr. Cook be elected a life member of the Society in recognition of his valuable services. Dr. Gibson seconded the motion, which was carried.

Sir H. Cooper moved a vote of thanks to the Honorary and Saturday Afternoon Lecturers, which was seconded by Lieut-Col. Saner, and carried.

Dr. Macmillan moved, and Mr. Hanwell seconded, a vote of thanks to the donors to the Museum, which was duly carried.

Sir H. Cooper proposed that a special vote of thanks be given to Dr. Longstaff for his liberality to the Society in offering it the purchase of adjoining property on very advantageous terms. Dr. J. H. Gibson seconded the proposal, which was carried.

Dr. Gibson moved, and Mr. Hill seconded, a vote of thanks to Mrs. Earle for the presentation to the Society of two valuable pieces of sculpture, which was also carried.

Mr. Hill suggested that the incoming Council be recommended to revise the catalogue of the Museum.

The President being obliged to leave the town on urgent business, Mr. Craven, V.P., took the chair, and Dr. Pyburn, Mr. Nash, Mr. Burkinshaw, and Mr. Gregson were then appointed Scrutators. They declared the voting to be as follows :—

President :—A. K. ROLLIT, LL.D., D.C.L., B.A.

Vice-Presidents :—R. M. CRAVEN, M.R.C.S., J. H. GIBSON, M.D.

Treasurer :—C. COPLAND, C.E.

Secretaries :—T. M. EVANS, M.R.C.S., B. CARLILL.

Council:—

Z. SCAPING.	G. F. ELLIOTT, M.D., M.A.
W. T. DIBB.	L. W. LONGSTAFFE, F.R.G.S.
J. L. JACOBS.	T. WALTON, F.C.S.
W. HUNT, F.R.H.S.	A. J. MACMILLAN, M.D.
C. R. LAMBERT.	J. P. BELL, M.D.
R. H. B. NICHOLSON, M.R.C.S.	REV. H. L. CLARKE, M.A.

Gull Literary and Philosophical Society.

SESSION 1876 - 1877.

FIRST SESSIONAL MEETING, 7TH NOVEMBER, 1876.

The President, A. K. Rollit, LL.D., B.A., in the Chair.

A list of donations to the Museum since the last Session was read, and the following were proposed as Members :—Messrs. E. T. Sharpe, J. Lacy, W. Shawcross, E. Laverack, J. Baynes, junr., E. J. Humphrey, T. Cook, W. Bailey, J. Atkinson, W. B. Spurr, B. Pickering, junr., J. Meyer, R. H. Dawson, Mrs. Rollit, R. Starr, T. Good, J. Shaw, W. Burwell, W. Glossop, Pudsey, W. Easten, H. Hare, T. H. Greasley, T. Kirk, S. Cohen, R. Middlemiss, Lewendon, H. Webster, P. Reed, J. D. Sibree, H. F. Smith, W. Ford, Frankish, Firth, R. Baxter, Stephenson, C. Garthorne, P. Strommer, W. Davidson, W. Malone, H. J. R. Pease, S. Walliker, Mrs. Leatham, W. Fussey, Fairbrother, Crook, J. Torry, J. Pease, T. Downs, Lennard, J. Stuart, T. Massam, Horsley, W. Bernard, C. W. Cheesman, C. W. Holdich, E. H. Moss, J. T. Simpson, B. M. Swales, R. V. Knowles, W. R. Ridsdale, G. T. Appleyard, G. R. Park, Saltmer, Horsley, R. Collinson, J. M. Julian, J. F. Askam, Rev. G. Ohlsen, Messrs. W. Carlill, J. Field, J. Oldham, W. Rymer, J. Booth, J. W. Holder, J. Fergus, J. Leak, Rev. S. B. Craig, Messrs. C. Kelsey, J. P. Chatham, Watson, junr., W. Gilbert, W. Rayment, A. Smith, G. H. Clarke, H. Franks, Stoolle, Captain Hedger, Messrs. R. Cattley, G. Fryer, C. S. Evington, E. T. Wise, T. R. Runton, J. Ehlers, E. Cheeney, R. Vivian, Reed, F. S. Brodrick, J. W. Whiteley, J. K. Sharpe, Carlill, C. B. Bell, J. D. Holmes, G. Taylor, W. Wheatley, W. H. Wellstead, Peane, J. P. Gray, Rev. J. McCormick, Rev. Canon Scott, Messrs. J. Stephenson, R. Peach, J. Scott, T. Smith, W. Pool, G. Peacock, W. Sissons, C. Richardson, F. Neale.

The President then delivered an "Introductory Address," of which the following is an outline. He said his first duty was to thank them for electing him their president. He was conscious that if the honour had been worthily bestowed there were many by whom he was surrounded to whom it should have fallen—many whose long services to the Society must have entitled them to the chief reward which their fellow Members could confer. He followed high precedents in saying one or two words upon the present position of their Society. The Council had long felt the necessity of an increase in the number of Members, and he was glad to inform them that the one hundred and twenty who had been elected that evening not only advanced their roll to five hundred, but rendered it larger than it had ever been during the history of the Society. With that increase their position was perfectly sound; but he wished to impress upon them the necessity of regarding the present standard as the lowest which could be financially safe, and to counsel the increase of the number of Members to at least 1,500, which Hull ought to furnish, and which was essential to the work which the Governors of such an Institution might legitimately hope to do. True, their past and present efforts had been productive of good results. The Museum and Saturday Afternoon Lectures were appreciated by the working classes, for whose benefit the latter were chiefly designed; the Science Classes furnished for Hull the national want of good technical instruction, and one of their scholars (Mr. Wright, pattern maker,) had done honour to himself, the Society, and his town by taking a Whitworth Scholarship of £100 a year; while University teaching had been localised in their building for the benefit of all classes, including ladies—the prelude perhaps to a system of locally resident Fellows. The Council, moreover, were urging the delivery of lectures in Hull under the Whitworth Technical Trust, and were also considering the formation of a local loan collection, aided from South Kensington—while the Society would be addressed during the winter by some of the most representative men in Science, Literature, and Travel, including Commander Cameron, who would not only tell the story of his journey across Central Africa to their Members, but would give a

free lecture to the working classes. Such was the proposed work of the Society during the coming Session, and he trusted it might be regarded as indicating a desire on the part of the Council to popularise the Institution, while maintaining its high Literary and Scientific character, and to extend its advantages to all classes, without pandering in any degree to the desire for mere amusement divorced from instruction. Passing from local topics, he must say a few, and only a few, words of the Glasgow meeting of the British Association. The general tendency of the Scientific opinion which found expression there was, he thought, in favour of placing some limitation upon the theories of the speculative and imaginative Schools of Science; to apply the severe test of physical methods to the temporal—perhaps he should say the eternal,—demands of Geologists and Zoologists, and to countenance some modification of Lyell's theory of the uniformity of the processes of world-building and earth-sculpture, by admitting the probability of greater and more recent cataclysmic, or catastrophic, or violent and sudden, action than had latterly been supposed. On these points, however, he would say more shortly, but, as a whole day was devoted in the Anthropological section to Spiritualism, he might, perhaps, be pardoned for giving it what he felt to be an undue prominence for a few minutes that evening. The significance of the Spiritualistic debate at Glasgow, had, he thought, been unduly exaggerated. The Chairman, always a distinguished Naturalist, now a Super-Naturalist, was prejudiced and partial from the first. The paper of Professor Barrett, of whom Mr. Crookes, F.R.S.,—himself an enthusiastic Spiritualist,—spoke as “just nibbling the edges of Spiritualistic phenomena,” was meagre in its relation of facts, or rather appearances, and weak in reasoning from them. The Chairman's ruling that he would hear only those who could speak from experience must have been designed to secure a one-sided discussion, since it excluded unbelievers—of whom he was one,—from being heard at all; for, logically, the negative experience of some was no disproof of the positive experience of others. Hotspur, or any other man, might call spirits from the vasty deep, and they might fail to come, but that, in itself, was no disproof that they might come

when Glendower called. Moreover, such a rule enabled the Spiritualists to escape the whole difficulty of the question, since our doubt was, not whether those who summoned the spirits believed they saw or heard their manifestations, but whether their inferences from what they saw were just or entirely fallacious. It seemed to be either forgotten or ignored that the problem was one of judgment rather than perception—of reason, not of mere sensation; while the rule of debate which forbade the use of argument as a test of experience, and the cross-examination of either Spiritualists or spirits, was really of the nature of the séance in the dark, and justified the criticism that the victims believed and did not like to be undeceived. Hence the discussion, like the subject, was unworthy of a great Scientific Association, and was confined, with one or two striking exceptions, to a few renegades and runaways from the regiment of Science, who, like the spirits whom they worshipped, were apparently incapable of saying anything worth listening to. In his opinion, formed on some little experience, Spiritualism, in its pseudo-scientific aspect, had no foundation whatever, and was not a rational belief. It was a cardinal principle of true knowledge that all advances must be made from the known to the unknown. It was the leading feature of natural Science to grow, and to be capable of cultivation, by any man, and anywhere, for there were no priests of nature to whom she gave a monopoly of her secrets; she simply required to be sought in her open temple, in the broad daylight, and in sincerity and truth. The only facts at present established about Spiritualism, however, were that certain strange things were done, but these things—which were generally very silly, and always useless—were not beyond explanation by causes admitted by Scientific men, and very familiar to lawyers, which included sleight-of-hand, trickery, and fraud; and there was no proof whatever, in any sense of the word, of the agency of those clamsy creations called spirits. To judgment, therefore, with those whose tricks had neither the ingenuity nor the courage of those of the mediæval miracle-workers, who imitated by the feeble experiment of a live coal upon the head the Arabs who washed their hands in molten metals, and sat at their ease in flaming straw, and whose best performances were unequal to those recorded

of the conjurer Houdin;—to some more safe retreat with those Fellows of the Royal Society—*O! facilis decensus averni!*—who exhibit the hair of female ghosts as trophies of their intimacy with the supernatural; and away with Spiritualism itself from the Palace of Truth to that Bluebeard's chamber which the forbidden key of Science has locked upon the crystal spheres of the planets, the four elements, the principle of levity, caloric, phlogiston, and other headless, but much more beautiful, unscientific victims. Having spoken of that which was certainly not Science, whatever else it might be, the President devoted the remainder of the evening to a general sketch of the progress and present position of Physical Science—the Science of the inorganic universe—proposing to complete his review of modern Science on some further occasion by the consideration of “biology.” In his review of Physical Science he dealt first with the history of the earth in time, including the story of its formation, or geology; and the structure of its matter, and the nature, characteristics, and relations of the forces by which it is surrounded—together forming the science of physics proper. His next inquiry was into the relations of the world to the universe, or its position in space, including the sciences of astronomy and celestial chemistry; and, lastly, he said there would remain for consideration the present configuration of the globe, or geography. But he observed that he should be able, at the most, to take the cream off physical science, and to give but a limited view of even the chief peaks of the highlands of human knowledge—of that true wonderland, which, after all, could be seen only in the dim twilight. First, then, he said, of the origin and nature of that world in which we live—a world which Thales and the earliest Greeks believed to be flat and floating, and to be made of water; which Xenophanes and Anaximander declared a flat-topped cylinder, fixed, and of infinite length; which Anaximenes imagined a broad leaf made of air, as Heraclitus of fire; which Diogenes of Apollonia named a living being, breathing through the stars, and born of spontaneous evolution; and which Aristotle—whose seal was on all branches of knowledge—first positively declared a globe. He referred to the new astronomy, in the dramatic birth of which Galileo was the great actor, and said

that when that victory was achieved the heavens ceased to be the scene of conflict between Science and Religion—the war descended to the earth; and upon the question of the world's age, the cosmological battle between Truth and Religion, narrowly interpreted, had raged fiercely, and was even now only just closing. The theories of Geologists had been sought to be confuted from the same sources as the arguments of Columbus by the Council at Salamanca; but, at last, the coincidence of testimony—Astronomical, Geological, and Zoological—had been such as to convince all thoughtful men that the chronology which supposed the world to be only some 6,000 years old was as untenable as the system which placed the earth in the centre of the universe. The conflict of Geology with Religion was now, however, all but over; a day in the language of Holy Scripture meant no longer a single revolution of the earth, but myriads of ages—a great conception, which enabled our finite minds to approach that of the grandeur and eternity of the Creator and Designer of it all. Dr. Rollit then spoke of the most probable theories of the earth's origin, noticing modifications of the nebular hypothesis of Laplace, which he described, and the theories of impact, or collision of the earth's materials with planetary velocities, giving rise to its original high temperature. He then spoke of the period when the earth was a molten mass, and viscous or plastic, if not liquid—a supposition which he said was absolutely certain, and which he illustrated by numerous geological and other proofs. The Lecturer then traced the formation of the crust of the globe and the process of solidification, and discussed the hypothesis that at the present time the interior of the earth, at a depth of a few hundred miles, is at a temperature far above the melting point, but still solid,—in consequence of the enormous pressure,—except in comparatively small spaces filled by liquid lava. He spoke of the wrinklins and crumplings, and volcanic outbursts; the play of forces which had raised mountain ranges; the birth of igneous or fire-born rocks; the creation of granites, and the intrusion of metals into the rocks; and he also noticed the probable mode of formation of air, seas, and the process of earth-sculpture. He referred to the movements which are still taking place in the earth's crust, of which he gave

instances, and then proceeded to describe the formation of the present configuration of the earth according to the theories of Lyell and the uniformitarian school of geology; and he traced the formation of the various geological strata, and the existing physical features of the globe. He said that modern geology had enounced the doctrine of the gradual formation of our globe since it became solid; that denudation, erosion, or eating away, and deposition, or laying down, were the creative trinity; time the condition of their action; that there is no abrupt boundary between the present and the past,—the present lies dying upon the body of its victim, and the avenging future is ever casting her dart at the present. The whole course of nature showed how slow were her pulsations—what mighty ages she took to eat out a Niagara from the rock, or even to furrow the flanks of a Ben Lawers. It was not, therefore, unnatural that Lyell and the uniformitarian school should be deceived by the apparently eternal reverie of nature, and be led to some conclusions which our most modern Science was beginning to question. Their main position—that it was not necessary to imagine any extraordinary violence of nature—was unassailable; but there was a disposition on the part of Lyell's disciples to push his theory of uniformity of action and causation a little too far. Dr. Rollit then applied the same principles to an examination of the Glacial theory, and concluded that the hypothesis of a great ice cap, or universal mantle of ice, mountain-deep, having once covered the greater part of temperate Europe, Asia, and America, was open to question, though the action of ice—"the mighty polisher"—was, of course, an established fact. Nevertheless, its action in lake formation had, he thought, been exaggerated. Dr. Rollit then discussed the question of the earth's age, and said that the postulate of the uniformitarian school of geology, and of zoologists, of almost unlimited time for the work of creation, was one which had latterly been questioned. The Duke of Argyll,—himself a Geologist,—had said he thought his friends had been a little too "bumptious" in requiring almost infinite creative ages, and he was glad that they had come under the powerful battery of Physical Science. He ventured to ask, therefore, how long had elapsed since the world had begun to set, or be solid? Was

it, to speak paradoxically, lost in infinite or finite infinity? Was it unlimited and indefinite,—millions and millions of years, as Geologists and Zoologists contended,—or was it, as the Physicists maintained, a limited, though somewhat uncertain, quantity? He noticed the geological and biological arguments in favour of almost unlimited age, and then explained the objections and tests of the Physicists, based upon the loss of the earth's internal heat by radiation into space, upon the tidal retardation of the earth, and upon the sun's temperature; and he stated that the conclusions of the physical school were that some hundred millions of years ago the earth must have been at a white heat, and utterly incapable of supporting animal or vegetable life, as we knew it from fossils. He said the drift of the physico-geological controversy seemed to be that some more moderate limit must be placed upon the earth's history in time than had hitherto been spoken of by Science at random. The extent of the limitation was, however, still uncertain, and probably undefinable, many of the essential elements in the problem,—probable shiftings of the earth's axis, and fluctuations in the rate at which the sun and earth may have lost their heat,—even absolute or relative rates of rock formation,—being still unsettled, though they were being worked at by the new geological school.

Dr. Rollit then discussed the nature of the matter of which the globe is composed, and summarised the more probable modern opinions as to the nature of the raw material of which the universe is built, premising that each of them was consistent with creative power, for—to use the Indian illustration—the clay is not, and cannot be, the potter. He explained the atomic theory, which he said was as old as Democritus, Epicurus, and Lucretius; a second theory, which he said might be called the geometrical point hypothesis, which, however, was really a mathematical fiction; and lastly, the theories of heterogeneity, or patchwork, or coarse-grainedness, and vortex motion, remarking, in reference to the former, that Sir William Thomson had calculated that if a drop of water could be magnified to the size of the whole earth its ultimate component particles would then appear of the size of tangerines. Having explained the solid and liquid states or conditions of matter, the Lecturer said that the modern view of

the constitution of a gas was that its particles were little hard, 'free-and-independent' bodies, supposed to be flying about with great velocity in all directions, and constantly impinging upon each other and upon the sides of a containing vessel—a theory which seemed to be conversely represented in Social Science by the little, 'free-and-independent' bodies who rushed frantically about in society, especially at election times, and were spoken of as being all "gas" or "gassy." Upon this theory it was calculated that the velocity of particles of hydrogen was about 6,055 feet per second—a velocity greater than that of a cannon ball; that every particle had about 17,700,000,000 collisions per second; and that they were moving at a rate of about 70 miles per minute.

The Lecturer then passed to the natural forces by which the earth is environed, and defined and explained light, heat, electricity, etc. He described the light theories of emission and undulation, saying that light was mere wave motion in a sea of ether, produced by the vibration of the particles of luminous bodies; and, by this theory, he explained the phenomena of interference, refraction, polarisation, colour, fluorescence, phosphorescence, photography—the effects of the last of which, he observed, were the products of the wavelets, not the great rollers, of light—and the action of the radiometer, which he showed and explained to the audience, noticing the various theories of its movement. Dr. Rollit then dealt in the same manner with heat, which, he said, like light, was energy of vibration, or simply quivering motion. A hot body was in a state of intermolecular commotion; and, upon this theory, he explained the elastic force of air, conduction, latent heat, the mechanical equivalent of heat, &c. He also referred to the defects of modern engines, and contrasted their imperfection with the mechanical perfection of water and tidal power. Having touched upon acoustics, electricity, and magnetism, the lecturer explained the theory of the conservation or persistence of energy, and then traced the history of modern astronomy, spoke of the improvement in astronomical instruments, and of the revelations effected by the spectroscope, which had given birth to a new science—that of celestial physics and chemistry. He explained the principles of the science of spectroscopy, and pointed out that the probabilities

of the existence of the same substances in the sun and stars and upon the earth were mathematically enormous ; for instance, the chances were one hundred thousand billions to one that iron existed in the sun's atmosphere. He showed how the spectroscope had been applied to the discovery of new metals and other substances, to quantitative analysis, and to the detection of substances in other worlds. He described in detail the nature of the sun, of its red prominences, and the corona, with which he observed the Aurora had probably some similarity, a point on which the Arctic expedition was expected to afford valuable information, but in which it had failed, the Aurora being found to be less striking in those high latitudes than in England, and to be visible in a southerly, and not, as here, in a northerly direction. He noticed the theories of the sun spots, and remarked that their school-day distance of the sun had been reduced from ninety-five to about ninety-two millions of miles. He also spoke of the probable origin of the sun's heat, and then referred to the moon, to which, he noticed, a guide-book had been published. He discussed the existence of a lunar atmosphere, and stated the latest views as to the nature of the moon's surface. Our satellite might be regarded as a dried up, or burnt up—or, as some thought from the low levels of the floors of the lunar craters, a boiled up—world, in which animal and vegetable existence was impossible—a weird-like solitude, a waterless waste, of which, except for scientific reasons, one could never desire to see the other side. Dr. Rollit then described the leading features of Jupiter, Saturn—especially the erape-ring,—and Mars ; also the comets, of which Kepler had said that there were more in the heavens than fish in the ocean. Descending once more to the earth, the Lecturer referred to the vast additions which had been made to our ascertained geography since Prince Henry of Portugal sent forth his expedition along the coast of Africa,—Africa, the great scene of discovery from the days of Vasco de Gama. He said that in the progress of Geographical Science the age of Victoria would be pre-eminent. It was, indeed, a coincidence that the rule of queens had been the most favourable to the work of exploration. Isabella of Spain defied the orthodoxy and ignorance of her people, and even her Council, in favour of Columbus, and added a Continent to the known

world ; the age of Elizabeth had no rival in the art of maritime enterprise, in peace or war, except our own, and the names of the gallant Barents, Frobisher, Hudson, Davis, and Baffin, no compeers in the work of Arctic navigation—except those of our own period—down to Captain Nares and his heroic comrades, who had rendered the same service to Science as Captain Cook, and Captain Nares himself, had rendered in Antaretic Seas, by showing that there was little or nothing to discover,—in itself a great discovery. He then summarised the results of the last Arctic Expedition, remarking that it was evident that travelling over the Polar Sea was impracticable, and the Pole itself unapproachable, at any rate by the route last taken. Nor did there appear to be much to repay such exertions. Natural phenomena,—even the Aurora,—were left behind. Biology gave no greater inducements to proceed. Man had disappeared altogether ; while the warm Arctic Sea, teeming with life, proved to be as imaginary as the gardens of the Hesperides or Ultima Thule. There was an almost lifeless desert of ice, and nothing more. But the discovery of fossil corals and coal pointed out as vast changes of climate in the Arctic regions as those which had marked other parts of our globe. The President then spoke of discoveries in Antaretic Seas, and in Africa, the maps of which, he said, half a century ago, bore the words “wild beasts,” undiscovered parts,” or “unexplored,” in the void which geographers were compelled to leave in the centre, but which had been transformed into pictures of great fresh-water seas and majestic rivers rolling to pour their burden of wealth into the arms of enterprise ; while a new Science had been established since our schooldays in the physical geography of the sea, which would henceforth be known to us scarcely less than the dry land ; which, since the Challenger and other expeditions, was recognised as the cradle of new worlds to spring from the globigerina ooze now forming into chalk, and from red pumice clays, spread over vast breadths of the ocean ; as an expanse of abysmal depths, of hill, valley, table-land, crevasse and ridge ; as the theatre of vast migrations of the waters of the globe—the principle of which he explained ; and as the scene of a wonderful and beautiful fauna.

Dr. Rollit concluded by pointing out the universality of law, and the constant rhythm of the forces of nature,—a law and a rhythm

which "had made even the invisible atoms to march in tune." and which had exalted our conception of the Builder of the Universe, who worked, not by caprice, not like fate or chance—the deities of early philosophy—but upon one harmonious, primeval plan. This was the lesson he had endeavoured to convey, and even if he had failed in this purpose, and in the greater one of giving some information upon the progress of physical science, he had at least endeavoured to do his best, with the limited time, means, and knowledge at his command, to perform a duty which custom demanded of their president, and he had the consolation of feeling that, though he might not have succeeded, he had, at all events, not been forgetful of the obligations of his position.

The Lecture was illustrated by the oxy-hydrogen light; and some excellent photographs of the moon, solar eclipses, spots, prominences, spectra of the stars, &c., were shown.

The Mayor (ex-President Dr. King) moved a vote of thanks to the President for his address. He also alluded to the great addition of Members, and the excellent syllabus of the Lecture Session, both due to the efforts of the President since his election.

Judge Bedwell, M.A., J.P., seconded the proposal, which was carried with loud applause, and acknowledged.

ORDINARY MEETING, 15TH NOVEMBER, 1876.

Dr. Rollit, President, in the Chair.

Mr. R. A. Proctor, B.A., F.R.A.S., delivered a Lecture on "The Giant Planets—a Study of the Condition of Saturn and Jupiter."

Mr. Proctor said he proposed to bring before his hearers a theory about the Giant Planets, which, though not altogether new, was not commonly accepted, as it was opposed to the ordinary views of the solar system. All the planets had been regarded as bodies like the earth, fit to be inhabited: this belief, however, was not based upon specific evidence. He should be able to show that there was not a particle of evidence tending directly to the theory that the planets, Jupiter and Saturn, were in the same state as the earth, whereas

there was an overwhelming mass of evidence tending to show that they were young planets in the stage of preparation, and, notwithstanding their giant size, to be regarded as "baby planets." He then adduced various arguments in support of the above statements. He referred to that based on the origin of the solar system. He recognised that the system had developed to its present state; its growth had been like that of a tree. There was in fact evidence of evolution proceeding throughout nature, and the belief in it was not opposed to belief in the wisdom in which all things were made. It was manifest that the earth and the planets had once been in a state of intense heat, and there was evidence of a former oneness in the condition of the solar system, as, indeed, there was of a perfect uniformity in the process of the formation of the universe. This brought him to the theory upon this subject propounded by Laplace, and he described that theory at length. As to the present condition of the planets, Laplace held that a process of consolidation was going on, but he wished to show that in this respect the theory was defective, for the evidence went to prove that the planets were in process of growth, receiving supplies from meteoric and other sources. Having regard, then, to their original condition, and to the belief that at first they were all in a state of heat, it was evident that their respective sizes would materially affect the relative time they would take in completing the process of formation. He believed the two planets then under consideration were undergoing the process of growth; and supposing them to have been formed earlier than the earth, still, from the difference in their sizes, they would be longer in their development, from only having parted with a small portion of their original heat. After illustrating these and other views by means of the oxy-hydrogen light, the Lecturer concluded by expressing a belief that, whilst all things in the universe seemed to be proceeding from infancy to old age, and there were signs of an ultimate universal decay, still it was possible that this present visible one was not the only universe or order of universe; but that, as men had once believed the earth to be the centre of the universe, but had afterwards found themselves mistaken, so it might be shown that this was not the only order of universe, but that there might be higher and lower orders.

The President referred to the Lecture in complimentary terms and, on the motion of the Mayor (Dr. King), seconded by Sir Henry Cooper, a vote of thanks was given to the Lecturer.

ORDINARY MEETING, 21ST NOVEMBER, 1876.

The President in the Chair.

The following gentlemen were proposed as Members, viz :—Mr. John Hudson, Mr. F. Amos, Mr. William Newton, Mr. W. W. Tothill, Mr. Robert Hodgson, Mr. H. Sleight, Mr. James A. Bulmer, Mr. Thirkell, Mr. Thomas H. Dale, Mr. Stephen Gardner, Mr. E. P. Maxtead, Mr. William Tesseyman, Mr. T. J. Dossor.

The President called upon Dr. Henry Charlton Bastian for his promised Lecture on the Nature and Origin of Living Matter.

The Lecturer remarked that in considering the nature of living matter it was necessary to observe what were the simplest forms of life, and what were the properties which these forms displayed. These, he said, were comparatively simple, and living matter had the power of growing when placed in a suitable medium, and also of absorbing substances which existed around it of a similar kind to that of which its own substance was composed. It had also the remarkable power of changing its shape, and, if the little organisms of the lowest forms of life were observed by the microscope, it would be seen that from moment to moment their outline varied and their shape changed as they moved from place to place. The molecular flexibility of these organisms also gave them the power to divide themselves, and the question was whether living matter always came from the material growth of some pre-existing form of life, or whether at times, under particular conditions, living matter might originate. In elucidating this Dr. Bastian shewed that if some portion of animal or vegetable substance was steeped in water, and the fluid was left exposed ten, twelve or twenty-four hours at an ordinary temperature, it would become quite opaque from being filled with myriads of organisms, the alteration in colour and appearance being alone due to their presence. The Lecturer showed by

diagrams the forms of these organisms, and pointed out the difference in shape between organisms in acid and alkaline fluids.

Dr. Bastian observed that the question whether living matter could or could not originate independently of pre-existing germs had a threefold interest to the naturalist, the chemist, and the medical profession, and he also alluded to the theories which had been advanced in England, France, and Germany as to the heat necessary to destroy the organisms he had described. These, he said, had been found by experiments to resist heat longer than the higher organisms, and the point at which the death of these would be produced by heat remains to be decided in the future.

The President, Dr. King, Sir Henry Cooper, Dr. Gibson, and Mr. Craven took part in a discussion which followed, and, after vote of thanks to Dr. Bastian, the meeting adjourned.

ORDINARY MEETING, 8TH DECEMBER, 1876.

The Ex-President (the Mayor, Dr. King) in the Chair.

J. G. McKendrick, Esq., M.D., F.R.S.E., gave a Lecture on "Musical Sounds," with experiments.

Dr. McKendrick explained the creation of sound, and its passage through the organ of hearing, to the brain. Sound was divided into noises and music, the latter being produced by a certain number of impulses or vibrations in a given time, recurring at regular intervals, whereas noises consist of crowded and irregular sounds. The difference in the intensity, pitch, and quality, or timbre of musical sounds was then fully explained; and, by means of most interesting experiments, it was clearly shown that the fluty tone or quality of an organ diapason depended upon its purity and the small number of harmonies generated; the metallic and ringing quality of the trumpet and reed stops, resulting from the comparative irregularity of the vibrations and the numerous harmonies, especially in the upper part of the register. Organ builders acted upon this principle, and by the addition of "mixture" stops could give a brilliancy and pungent metallic character to their instruments. By means of

revolving mirrors and gas jets, which by a simple mechanical arrangement were connected with organ pipes, the Lecturer enabled the audience to see clearly, as well as to hear, the combination of musical notes in simple harmonies.

On the motion of the Mayor, seconded by the President, a cordial vote of thanks was accorded to the Lecturer.

ORDINARY MEETING, 19TH DECEMBER, 1876.

The President in the Chair.

Rev. Maurice Davies delivered a Lecture on "Fun—Ancient and Modern."

The Reverend Lecturer commenced by giving a definition of fun, which he characterised as harmless incongruity, and then went on to notice fun in different ages of the world. He referred first to the fun which eventually developed into Athenian comedy, and then to troubadour fun, which, he said, infected a great many writers, even down to Chaucer. After briefly glancing at the broad grins of George Coleman, jun., he touched upon the writings of Sydney Smith and "Ingoldsby," and concluded by noticing Yankee humour. The Lecturer dealt with his subject in an able and highly-entertaining manner, and in the course of the evening read several humorous extracts from various authors.

The Lecture was frequently applauded, and at its close a vote of thanks was, on the motion of Dr. Craven, seconded by Mr. C. E. Copland, unanimously awarded to Dr. Davies.

ORDINARY MEETING, 2ND JANUARY, 1877.

The President in the Chair.

The President, in introducing the Lecturer, said that they were honoured by the presence of one of the most distinguished travellers of this or any age, and he was glad that the

public reception accorded to Captain Cameron was worthy of his great exploit. From Hull such a reception was especially fitting and welcome, for by its monument of Wilberforce it commemorated the victory of freedom over slavery; it was one of the few towns which traded with the West Coast of Africa; and one of its ships,—the *Bengo*,—had given shelter and a home to Captain Cameron at the close of his three years' wanderings. The country, he said, owed much to such self-sacrifice as that of Captain Cameron's. During the last sixty years more had been learned of Africa than during the 1700 since Ptolemy; the gaping void which yawned in the centre of old maps, and which was marked as "undiscovered regions," "unknown parts," "wild beasts," &c., had been transformed by a gallant band,—of whom the first was Mungo Park and the last Captain Cameron, linked together by the names of Livingstone, Baker, Speke and Grant, Stanley, and others,—into a network of grand rivers and fresh water seas, while Captain Cameron had united the eastern and western chains of discovery by traversing the continent, and had greatly reduced the region of the unknown. He had, too, done this as a messenger of peace,—without shooting down a savage,—and his was one of those victories of peace which were more renowned than those of war. His success, therefore, was the great pride of his countrymen, who heartily congratulated him on his safe return,—upon his services to the cause of freedom, science, commerce, and civilization,—and upon the close of his acquaintance with the chief who said to his brother black, "Don't be such a fool as to make friends with them; they are only a little caravan, and we could eat them."

Captain Cameron, in his introductory observations, remarked that he did not know whether the story he had to tell would come up to the anticipations of their President; and he might further remark that probably most of those present had heard of what he had done, as he had already often spoken about his travels. In September, 1872, he was selected by the Geographical Society to take charge of an expedition which had for its object the assistance of Dr. Livingstone in those geographical problems in which he had

been uninterruptedly occupied for nearly seven years. He arrived at Zanzibar in the beginning of 1873, at about the same time as the mission of Sir Bartle Frere to suppress the slave trade; and the journey of his party across Africa to Benguela, on the west coast, occupied two years and eight months. The first work he had to perform was the securing of money for the interior, for the moment the coast was left pounds, shillings, and pence were of no use, and everything had to be done by means of barter. The fashions of the tribes in the interior changed almost as much as they did in Paris, and they had, therefore, before selecting stores, to ascertain the news from the interior as to what was in favour among the wives of the chiefs. Beads had to be got for one place, wire for another, and a further variety for other places. Connected with him in the expedition were Mr. Moffat, Mr. Dillon, and Mr. Murphy. They had at first considerable difficulty in engaging men for the expedition, and for several reasons, one of them being that the natives imagined the expedition to be in connection with Sir Bartle Frere's mission, and another was the supposition that they were Government servants, and, therefore, they had a right to be charged five times above the ordinary rate for everything they required. After some difficulty men were got, and the Lecturer and Mr. Dillon commenced their journey on the 18th March, 1873. Soon after starting they had to pay tribute to a native chief, although they strongly protested against it. The first part of the journey was over a pleasant rolling country, and then they came upon a series of granite and quartz hills, which, although very pretty to look at, were very bad to travel over. Leaving the hills, they came upon a number of gorges, through which they had literally to fight their way, and knowing that they were travelling through a beautiful country which they were unable to see. They next came upon one of the worst pieces of African country, and they had for hours to struggle through a swamp of mud which was so soft that the tracks of elephants and giraffes did not remain long visible. Arriving at a better country, they waited for some time for the second caravan to come up. The Lecturer described the natives they came across in the regions through which they had passed. Some of them coiled wire around their necks until it was spread out so far

that their heads appeared as though they were being served up on brass dishes. He found it impossible to obtain information from "oldest inhabitants," as one who was spoken to talked about existing one thousand years ago. On the 28th of May the remainder of the expedition joined him, but was headed by only one white man, Murphy—Moffatt having died on the way. The Lecturer referred to the disinterested conduct of Moffatt, who had sold a sugar plantation in Natal—all he possessed in the world—for £600, and invested the sum in the expedition, hoping that at some future time he would be enabled to follow in the footsteps of his uncle, Dr. Livingstone, or his grandfather, Dr. Moffatt. Proceeding on their journey, they soon became in want of water, and one of their men and a donkey succumbed. About this time they found a "true believer," who had fallen into difficulties while trading as a merchant, and who had lent himself out to the leader of a caravan. This gentleman held the idea that no one ought to possess any property but a true believer, and, in furtherance of this idea, he was caught trying to impress upon a tribe that he ought to have all their property, and he would have succeeded in obtaining it if the Lecturer had not interfered. At one place, when they announced their intention to depart, the chief refused to let them do so, on the ground that they were the first white people who had passed that way, and he had sent round for his people and neighbours to have a look at them. These people had a habit of enlarging the lobes of their ears, and some of the extended lobes reached down to their shoulders, and were often used to hold a tobacco pipe, or a gourd used as a snuff-box. A most fashionable lady in this district was the wife of a chief who wore a head-dress composed entirely of copper coin strung together with wire. On arriving at Unyanyembe they were lodged in the same house as Livingstone and Stanley and Burton and Speke had been lodged. Here they were well treated, and received numerous presents from many great traders. They had to pay visits to these traders, and were most cordially received. Here they suffered considerably from illness, and their men deserted in great numbers. During September they received a letter from Sir Samuel Baker, which was answered, and which answer was duly received in England. Soon after they

received a letter from Jacob Wainwright announcing the death of Dr. Livingstone, whose body they were taking to the coast, and asking for stores, as they were almost exhausted. Supplies were sent, and in a few days the party arrived with the body. The natives assembled in great numbers to pay homage to the remains of the distinguished traveller. Murphy then resigned his position in the expedition, on the ground that its object was ended, as Dr. Livingstone had been found. On the 9th of November Murphy started to return to the coast, and, as Dillon was very ill, Cameron persuaded him to return also. Soon after the Lecturer received the news of Dillon's death. After resuming the journey the difficulties somewhat decreased, the men not deserting in such great numbers. On one occasion, however, twenty-five men deserted in a body on one day. As the object of the expedition was to recover Livingstone's journal and observations, he pushed on to Ujiji. He saw the Lake Tanganvika exactly fourteen years to a day from the time when it was first seen by Burton. On arriving at Ujiji he discovered that Livingstone's journal and maps were safe. He commenced a journey round the south end of the lake, and discovered that ninety-six rivers ran into it, and one great stream flowed out of it. Arriving back at Ujiji, he sent Dr. Livingstone's relics back to the coast, and continued his explorations. At one place the women had a habit of projecting their top lips, so that they stuck out like ducks' bills. At another place the men plastered their hair up into cones, by means of mud and grease, and between the cones the hair was shaved. He came upon a great river in Central Africa, which, at the place where he measured it, was 1,080 yards in breadth. It had a uniform depth of a fathom, and flowed at the rate of $3\frac{1}{2}$ miles per hour. This, in the Lecturer's opinion, proved conclusively that the river had nothing to do with the Nile, as it was only 1,400 feet above the level of the sea; and, as the Congo poured a great flood of water into the sea on the West Coast, he had no hesitation in saying that the river he saw, the Sualaba, was part of the Congo. They could not get boats to go down the river, and were delayed from November to June before they could get away from this part of the country. The chiefs appeared to be combined to put every obstacle in their way. Arriving

at Biha they came upon a chief, who, after a drinking bout of several days, shut himself up in a tent, and then told his tribe that he had been dead and had brought himself to life by means of his own powers as a magician. From Biha they passed on through the country called Boihundo, a most beautiful country, but by this time they were very much worn by the fatigues of the journey. They were then but a short distance from the coast, and as one of the men died, and as most of the party were suffering from swollen limbs, Commander Cameron determined to push on the last 126 miles with three men. They at last arrived at Benguela, where he suffered considerably from scurvy. He at last shipped on board the *Bengo*—a vessel owned, he understood, at Hull—and proceeded thence to Loando, eventually arriving at Liverpool in the steamer *Congo*. In conclusion, the Lecturer spoke of the future of the portion of Africa through which he had travelled. At present the trade was carried on by means of slavery, for the people would not engage themselves as carriers, and merchants were almost forced to obtain slaves, either by force or by exchange, to carry ivory to the coast. A merchant obtained, perhaps, twenty-five tons of ivory, and he must get some means of transit for it if he wished to carry on his trade, and the slave system was resorted to. Another cause of the slavery which existed was the selling of women to the Kaffir tribes. The only way, in his opinion, to put a stop to this slavery was to create means of communication with Central Africa, and that it was possible to establish good communication there was scarcely a doubt. The ivory trade would, he thought, pay a sufficient dividend to a railway company running to the East Coast. It was probable that the two great rivers, the Congo and the Zambesi, which ran into the heart of the country, could be developed so as to establish good communication with the interior. From the appearance of the river of 1,000 yards wide, which he had described, and formed part of or was connected with the Congo, he did not suppose there were any serious rapids between the point in question and the falls of the Congo, 160 miles from the sea. The various rivers could be connected with short canals, and steamers, of which there were already several, could be used on the lakes. It was early to talk of canals, but there seemed

to be no reason why the rivers should not be opened up and light railways constructed, so as to do away with the present extensive employment of human labour and slavery.

Captain Moresby, R.N., moved a vote of thanks to the Lecturer, alluding to his past acquaintance with Captain Cameron, and to the fact that, when quite young in the service, he gave indications of the fame which he had since so justly attained. The success the Lecturer had attained had not at all been the result of accident. The great thing they had to be proud of was that one of their countrymen had stepped out from the great crowd of nations, and led and pioneered the way across the great continent of Africa, which country was only waiting the energy and wealth of England to place it in the ranks of civilisation and commerce.

Mr. R. Jameson, J.P., seconded the motion, remarking that he could not but agree that there was a country open to European commerce and to English commerce of considerable value. At Hull they knew the value of a good river as an important highway for commerce; and surely these great streams of Africa, being of such vast proportions, must be more important in bringing produce to the coast.

The vote of thanks was carried with loud applause.

ORDINARY MEETING, 16TH JANUARY, 1877.

The President in the Chair.

The Minutes of last meeting were read. The following gentlemen were proposed as Members:—The Marquis of Ripon, Mr. Joseph Dalton, Mr. W. C. Beasley, Mr. F. J. Smith, Captain Jones, Mr. Alfred Crosskill, Mr. James Reckitt, Mr. A. Ellershaw, Alderman Dowsing, Mrs. Elizabeth Strachan, Mr. George Buckton, Mr. S. Earle, Mr. T. C. Steedman, Mr. Davis.

The President called upon Mr. Arthur Arnold for his promised paper on "Eastern Life and Manners."

The Lecturer having observed that, by a curious coincidence, the day on which he had been announced to give his Lecture

happened to be the first day of the Mahommedan year, proceeded to review the principal incidents in the life of Mahommet, and dilated largely upon the Koran and the lessons to be derived therefrom, remarking also upon the many erroneous opinions entertained as to the nature of its teaching.

He minutely described the customs and manners prevalent in Turkey and in Persia, and contrasted their mode of worship with that of the Eastern Church, observing that there was a beautiful simplicity in the Mahommedan mode.

The manner in which the Turkish ladies passed their lives was also depicted, and the Lecturer said he had seen some of these who had never left their houses in the whole course of their lives.

Mr. Arnold also shewed his audience the manner of dress adopted by the Turkish females, and gave some amusing descriptions of some feasts at which he had been present, and of the great capacity for enjoyment manifested by some of the guests.

The mode of farming the taxes was stated by the Lecturer to afford the opportunity to foster dishonesty and greed, as a very small portion of the amount levied found its way into the Treasury.

The President, having alluded to the instructive and interesting Lecture given by Mr. Arnold, asked the Mayor to propose a vote of thanks, which having been seconded by Mr. Jacobs, and carried by acclamation, the meeting adjourned.

ORDINARY MEETING, 30TH JANUARY, 1877.

The President in the Chair.

The Minutes of the last Meeting were read. The following gentlemen were proposed as Members :—Mr. E. P. Hardey, Mr. James Turner, Mr. John Jagger, Mr. Thomas Howden, Mr. Kirk.

The President called upon Mr. F. A. Bedwell for his promised paper on “A Little Science goes a long way.”

In a very interesting introduction the Lecturer shewed the great pleasure to be derived from the study of the works of nature, and reminded his hearers that whilst so many fields were open yet

very much might be learnt from those with which most were supposed to be familiar, and he demonstrated the value of a little Science by shewing from a variety of microscopic observations made by himself, and which were illustrated by carefully prepared and beautiful diagrams, the marvels of Creation as exhibited by the Vorticellæ, the Ascidia, the well-known Rotifer Melicerta, and the Parasitic Anemone. The marvellous growth, the adaptation of means to ends, and the wonderful provision prepared for the wants of these tiny creatures, were all descanted upon by the Lecturer as exhibiting not only the Almighty power but also the beneficence of the Great Creator, whose care for the smallest of his works was thus so powerfully manifested.

Contrasting the position of Man in that different condition in which he was placed by his Maker, with the creations which had occupied the attention of his hearers, the Lecturer deduced from these facts of Science the lesson enunciated by our Divine Master "If God so clothe the grass of the field, which to-day is and to-morrow is cast into the oven, how shall He not much rather clothe you, O ye of little faith," and he further enforced upon his hearers the extraordinary power conferred upon Man by his not only possessing the knowledge imparted by the revelations of Science but also those of Religion, and alluding to the advantages accruing from the simplicity of faith combined with that of a trustful obedience, he endeavoured to prove that a little of such Science goes a long way.

After a few remarks from the President, Sir Henry Cooper moved, and Dr. J. H. Gibson seconded, a vote of thanks to Mr. Bedwell for his Lecture, which having been carried by acclamation, the Meeting adjourned.

ORDINARY MEETING, 13TH FEBRUARY, 1877.

The President in the Chair.

The Minutes of the last Meeting were read.

The following gentlemen were proposed as Members:—Mr. Clutton Brock, Mr. D. C. Stuart.

The President called upon Sir William Thompson for his promised Lecture on "The Mariner's Compass."

The Lecturer observed that the origin of the compass was lost in obscurity, but it was generally believed that the instrument was known at an early date in China, and used there as a guide for travelling by land. It became known in Europe between 800 and 1100 A.D. Sir W. Thompson described the principle upon which the compass was constructed, remarking that the loadstone was a natural compass, and the discovery of the instrument was merely the discovery of a property of matter. How it was that the loadstone possessed its magnetic property was unknown. The manner in which magnets influenced each other was referred to, and also the discovery by Dr. Gilbert, of Colchester, in the 16th century, of the fact that the earth was a true magnet, and that it had the priority over all other magnets, and that it was from its poles that the poles of all other magnets had to be named. The induction of magnetism in the non-magnetised body, and the nature of the magnetic property when induced, were also described, and the causes which affected the working of compasses on iron ships were explained. The Admiralty Standard Compass was considered to be the best.

Sir William Thompson also exhibited one of his patent compasses with binnacle, and pointed out the chief objects aimed at in the invention. The patent card is constructed on an entirely new principle, and consists of a central aluminium boss, and an outer aluminium rim, connected by fine silk cords. Small magnets from two to three inches long are suspended by means of silk cords from the rim, and thin paper, marked with the points of the compass and degrees, is attached to the rim, and partially supported by the silk cords between the rim and the boss. By this arrangement the principal part of the weight is in the aluminium rim, and is consequently as far as possible from the centre on which the card moves. This gives a very long period of free oscillation which, from mathematical reasoning, is known to give great steadiness. The card with the needles is extremely light, the ten-inch compass weighing 178 grains, or only a twentieth of the weight of an ordinary compass of such dimensions. The frictional error is thus reduced to a very small amount. The

quadrantal error is corrected by a couple of iron globes about six inches in diameter fixed on the two sides of the binnacle. The semi-circular error is corrected by applying two adjustable magnetic correctors.

The President, after expressing his appreciation of the important Lecture with which Sir William Thompson had favoured the Society, called upon Dr. King to move a vote of thanks, which having been carried by acclamation, the meeting adjourned.

After the Lecture Sir William Thompson explained to a number of gentlemen the working of his new apparatus for taking soundings when the ship is moving through the water at any speed up to sixteen knots.

ORDINARY MEETING, 27TH FEBRUARY, 1877.

The President in the Chair.

The Minutes of the last Meeting were read, and some donations to the Museum were announced.

The following gentlemen were proposed as Members :—Mr. W. A. Hagestadt, Captain Dryden, Mr. W. Hewson, Captain Pepper, Mr. James Sykes, Mr. T. W. Clarke, Mr. Joshua Tewson, Mr. Thomas Lindley.

The President called upon Sir Henry Dryden for his promised paper on the “Architectural Remains at Wisby, in Sweden.”

Wisby, once the capital of the island of Gothland, was stated by the Lecturer to have been in ancient times a place of considerable importance, and to have had a very large amount of commerce, being the emporium where the traders of the northern countries met those of the eastern for the interchange of their commodities. Prior to the Norman Conquest of England it was the parent city of the Hanseatic league, and so numerous were the foreigners resorting to it that each nation had its own church and house of assembly. Hence it is exceedingly rich in architectural remains, and its present aspect is unique in northern Europe, being not unlike a ruined city in the

ancient world which the traveller expects to encounter in a southern or oriental region, but views with surprise in the far north amidst the mists of the Baltic.

The various peculiarities of architecture in these several churches were pointed out by the Lecturer, and were illustrated by a large number of drawings and photographs.

Christianity was introduced into Wisby towards the close of the tenth century, and within forty years had such influence as to create a complete change from Paganism.

Sir Henry Dryden also gave extracts from the Supreme Maritime Law of Wisby, which was long of paramount authority with seamen, one important law being with respect to load line which the Lecturer presumed to have been inside the vessel, as it stated that it was to be determined how high the goods should reach.

The President, having made some observations on the interesting Lecture with which Sir Henry Dryden had favoured the Society, called upon the Mayor to move a vote of thanks to the Lecturer, which having been seconded by Dr. J. H. Gibson, the Meeting adjourned.

MEETING, 5TH MARCH, 1877.

The Ex-President, Dr. King, in the chair.

Captain Moresby, R.N., of H.M.S. *Endymion*, delivered a lecture entitled "My Discoveries in New Guinea."

The Lecturer first of all referred to the discovery of the island of Papua, or New Guinea, which was the largest in the world excepting Australia, and was the first discovered of the islands of the Australian Sea. It was 350 years or more since it was first seen by white men, but that was from its western end. Navigation of various nationalities made known more and more of this great island. The Dutch established two or three settlements on the western shore, and claimed the sovereignty over that moiety of the island. During all

the time up to 1873 the eastern and north-eastern shores remained a *terra incognita*—their inhabitants, produce, and geographical construction were alike wholly unknown. This was mainly due to the fact that the eastern end of New Guinea was protected—or rather embarrassed—by stupendous coral reefs, extending for nearly 300 miles, and also because the inhabitants were supposed to be of the same fierce and hostile nature as those of the western part of the island. He then described a voyage of discovery which he himself made along the south-eastern position of the island whilst in command of H.M.S. Basilisk, stating that he was enabled to make the voyage in consequence of the fact that, having had certain duties to perform in Torres Straits, and, having performed them quicker than was expected, he had found himself with some six weeks on his hands. He referred to various places which he discovered on the voyage, including Port Moresby and the China Straits. He then described a second cruise which he made in 1874, this time under special orders. During this cruise he explored the D'Entrecasteaux group of islands on the north-east coast, and a large portion of the north-east coast itself. He referred to the inhabitants of the part of the island he had described. They belonged to a branch of the great Malay race. They were light-coloured, little, with small cheek-bones, and frizzled hair. Amongst them were some of a strikingly Jewish cast of countenance. They were cannibals. Referring to the latter fact, he said from his own experience he could state that it by no means followed that cannibalism was associated with a ferocious and bloody disposition. On the contrary, he had found it associated with much mildness of character and domestic softness. He described the habits of the people, stating that they were exceedingly kind to their children, but had apparently no religion. He referred to the animals and general products of the country, stating that there were many valuable articles of commerce on the island. In the course of the evening the Lecturer exhibited a native of New Guinea, whom he had brought over with him in the Basilisk.

At the close the Chairman moved a vote of thanks to the Leturer, and this was seconded by the President, who had arrived in the course of the evening, and carried with acclamation.

ORDINARY MEETING, 13TH MARCH, 1877.

The President in the Chair.

The Minutes of the last Meeting were read.

The President called upon John Murray, Esq., of the Scientific Staff of H.M.S. *Challenger*, for his promised Lecture on "The Cruise of the *Challenger*."

The Lecturer gave an account of the voyage of the *Challenger* during her absence of three years and a half from this country, and explained how the scientific researches were made, and the chief known results. He described the means adopted for dredging mud, &c., from the sea bottom; trawling animal life from great depths, and ascertaining the temperature and current at various depths of the sea. The greatest depth of the ocean was found to be about equal to the height of the highest mountains, but the average depth of the sea was far in excess of the average height of the land. The Lecturer then detailed the result of the various researches, showing how animal life was more varied in the depths of the sea than had been previously supposed, and he also described the geological formations which were going on at the bottom of the sea. The Scientific Staff had commenced their work of investigation with the proceeds of the voyage, and the researches would lay the foundation for future investigation.

On the motion of the Mayor, seconded by Captain Moresby, a vote of thanks was accorded to the Lecturer.

ORDINARY MEETING, 27TH MARCH, 1877.

R. M. Craven, Esq., Vice-President, in the Chair.

Dr. J. H. Gibson was called upon by the Chairman for his paper "On the Music of Handel, Haydn, Mozart, and Mendelssohn Compared."

The Lecturer, in an elaborate introduction, reviewed the history and development of musical compositions during the last four centuries, pointing out how towards the close of the seventeenth century,

although music in Italy had attained its chief excellence, yet the high culture of music passed from Italy to Germany, and to the latter country Dr. Gibson awarded the palm, considering German music to be higher than Italian, inasmuch as it is a truer and more disciplined expression of the emotions. The sublime productions of Handel, Haydn, Mozart, and Mendelssohn, were then passed under review, the Lecturer pointing out that while the former had never been approached and never could be surpassed, there were marked points of difference in the style of his illustrious compeers which were distinctive and to be appreciated. Alluding to Mendelssohn, Dr. Gibson observed that his grade was with the highest, and his claim to this eminence consisted in the purely classical character of all his writings, and the irresistible beauty in the style of his musical expression which gave him an individuality not to be found in the music of any other composer. The Lecture was illustrated by selections from the works of the four illustrious composers, and these illustrations were of a very high order, and the Society was much indebted to the various artistes, whose execution elicited repeated applause, the thrilling performance of Mr. C. H. Hunt giving unbounded satisfaction. The Chairman, in eulogistic terms, proposed a vote of thanks to Mr. Gibson, who had on former occasions also laid the Society under obligations to him for Lectures on musical subjects, and this having been seconded by Mr. Scaping, and carried by acclamation, the Meeting adjourned.

ORDINARY MEETING, 3RD APRIL, 1877.

The President in the Chair.

The Minutes of the last Meeting were read.

The following gentlemen were proposed as Members :—Mr. R. Hailstone, Mr. C. Ford, Mr. W. Moran, Mr. J. Fountain.

The President called upon Professor Morley for his promised Lecture on “Spenser’s Faerie Queene.”

Professor Morley, after giving a short sketch of the life of

Edmund Spenser, and noticing the stirring times in which he lived, and the influence of these on his character, alluded to the publication of his "Shepherds' Calendar," which showed the bent of his mind, and of the religious feelings with which he was imbued, these embodying those of the Puritans in the broadest sense of the word.

Spenser was held by the Lecturer to be Milton's original, and although there might be a greater amount of austerity in one than in the other, yet there was, nevertheless, a considerable combination of sweetness with austerity in Spenser.

Professor Morley then very copiously analysed Spenser's poem of the "Faërie Queene," the interpretation of which title was the Glory of God, religion being the supreme subject, and the personations religious characters. These were severally pointed out and explained, and although to many the meaning might be obscure, yet, the Lecturer observed true poets never give a key to the understanding of their meaning, for as the soul cannot be defined, so the true soul of poetry is not to be measured.

Spenser was the English poet of his day, a ^{lively interest in} ^{being unbending} in his detestation of Roman Catholicism, he took freedom from the that struggle for liberty of conscience, and ^{which so pre-eminently} control of a dominant and persecuting church, characterised the times in which he lived.

The President, after some highly ^{stic remarks on the} ^{cooper to move a vote} ^{been seconded by Dr.} ^{adjoined.} beautiful beauty of the Lecture, called upon Sir Henry Elliott, of thanks to Professor Morley, which had been ^{adjoined.} Elliott, and carried by acclamation, the Meeting

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MEETING, 4TH APRIL

The President, Dr. Rollit, in the ^{novels, Old and New."} ^{novel, which, he said,} ^{olden Ass" of Apuleius,} Professor Henry Morley lectured on "The Golden Ass" of Apuleius. The Lecturer traced the history of the novel, which, he said, commenced in the second century with

a Platonic philosopher. He pointed out that many of the instances of the stories of Gil Blas and Don Quixote were borrowed from, or suggested by, the "Golden Ass." He then referred to the second great novel, the *Ethiopica* of Heliodorus, which, translated into English at about the time of Elizabeth, very largely influenced the literature of the period. Coming down to the twelfth century, he spoke of the Arthurian stories, first written by Geoffrey, of Monmouth, and then mentioned the *Decameron* of Boccaccio, written in the fourteenth century, which, he said, gave the word "novel" to literature. He next noticed the novelistic literature of Spain in the fourteenth century; and then alluded to the influence of Italian literature on the English nation at that period, and the production of Lilly's "Anatomy of Wit;" then to the novels of Robert Greene, one of the Elizabethan dramatists; and to the "Arcadia" of Sir Philip Sydney, published in 1590, which he said was the first of a new form of English novel, blending the pastoral and the heroic—a form of novel which obtained also in France shortly after, many of the works published in that country being translated into English. The novelistic literature of this period was very artificial, and addressed almost exclusively to the better classes, but after the Revolution a great reaction set in, and a new order of writing was instituted, which was the beginning of that state of things which now exists. This period was largely inaugurated by the "Robinson Crusoe" of Defoe, published in 1719. This was followed by a number of other stories by the same author—"The Memoirs of a Cavalier," "The History of the Plague," &c. These works had a great influence on literature, and were even imitated in Germany. The Lecturer next glanced at the "Gulliver's Travels" of Swift, a fine satire, once a man's book, though now a child's book. He then noticed the works of Richardson, Fielding, and Smollett, of whom he said Fielding was the greatest. After glancing at a few other points, he remarked that he would treat of the modern English novel in the Lecture which he had to deliver on "The Present Tendencies of English Literature."

A cordial vote of thanks was accorded to the Lecturer at the close, upon the motion of the Chairman, seconded by the Rev. H. L. Clarke.

MEETING, 5TH APRIL, 1877.

The President in the Chair.

Professor Henry Morley Lectured on "The Present Tendencies of English Literature."

The Lecturer indicated the great influence of the French Revolution, and the commotions of that period, upon literature, proving that in the first inception of the idea of liberty, fraternity, and equality there was a yearning amongst men to bring about a better state of things. The Revolution was politically a great mistake ; but it had beneficial effects, which might be seen in our literature. From the period when the Revolution occurred till now, mainly through its influence, the tendency of English literature was, in its highest forms, distinctly to realise that the perfection of the race must be obtained through the perfection of individuals, and that what was possible in the case of individuals was possible in respect to the race, and to promote what Tennyson called the "crowning race." In proof of his argument, the Lecturer referred at length to the writings of Wordsworth, Cowper, Crabbe, Jane Austin, Sir Walter Scott, and Maria Edgeworth, these being of the period contemporary with and immediately succeeding the Revolution. Coming down to the present time, he further illustrated his position from the writings of Tennyson and Browning, paying a very high tribute to these poets as the greatest exponents of noble and true ideals of humanity. Referring to Tennyson's "In Memoriam," he said this was the noblest poem on immortality in the language. He alluded to the works of Carlyle, who also advocated the development of the individual, and that men must look to the improvement of themselves for the improvement of the world ; next, to the works of Dickens, an author whose main motive seemed to be to bring men nearer and nearer to each other, and to teach the duty of man to do that which lies nearest to him ; then to the works of Thackeray, who, though he affected cynicism, did so with a purpose, and also preached the true ideal of simplicity and innocence ; and, finally, to the works of George Eliot, whom he called the chief living novelist, and who also promoted and illustrated the same great facts and principles.

At the close Dr. Rollit moved a vote of thanks to the Lecturer in highly eulogistic terms. The motion was seconded by Mr. William Hunt, and carried with great acclamation.

ORDINARY MEETING, 10TH APRIL, 1877.

The President in the Chair.

The Minutes of the last Meeting were read.

The following gentlemen were proposed as Members :—Mr. Edmund Balchin, Mr. J. D. Pauling.

The President called upon Mr. W. Chappell for his promised paper on “The Science and Principles of Music.”

Mr. Chappell, having briefly introduced his subject, proceeded to shew that music was purely a science of numbers, and he very elaborately pointed out the ratios these bore to each other, their degrees of consonance and dissonance, and their closer or more distant relation to the fundamental note or true base. The important law at the base of all music was that the sounds must be of aliquot parts, for otherwise discord and not music would be the consequence.

The Lecturer, having copiously enlarged upon these, minutely described the various instruments by which music as a science was exemplified, and exhibited a new kind of harmonium which had been specially constructed to illustrate the principle which he had enunciated, and, in conclusion, he observed that our scale of music was identically the same with that of ancient Greece, all the ratios having been given by various Greek Mathematicians, Pythagoras, who was supposed to have acquired his knowledge both in Egypt and in Babylon, having introduced musical science to his countrymen.

The President made some observations at the close of Mr. Chappell's Lecture, and then called upon Dr. Monk, the organist, of York Minster, and one of the Examiners in Music at Oxford, to propose a vote of thanks to Mr. Chappell. This the doctor did in very eulogistic terms, and his proposal having been seconded by Dr. J. H. Gibson, and carried by acclamation, the Meeting adjourned.

ORDINARY MEETING, 17TH APRIL, 1877.

The President in the Chair.

The Minutes of the last Meeting were read.

The following gentleman was proposed as a Member :—Mr. J. A. Story.

The President called upon the Rev. Isaac Taylor for his promised Lecture on "A. B. C."

The Lecturer commenced by saying that he had to speak upon the history of the alphabet ; to tell how and by whom it was invented ; how the sounds A. B. C. came to have the forms which they possessed, and how they came to represent the particular sounds which were assigned to them, and he should attempt to shew that the English alphabet carried us back to a date more remote than any other existing monument of civilisation.

In allusion to the art of writing, the Lecturer observed that it was that which had made possible history and also civilisation, for until men could have a record of the thoughts of others the world was stationary, and thus writing was held to be the instrument as well as the register of human progress. The attempts of different people to invent for themselves some mode of writing were enlarged upon by the Lecturer, who stated that all began in the same manner by picture writing ; all succeeded to a certain extent, but none succeeded in adopting the alphabet. Only one alphabet has been invented, that in common use at the present time, and the formation of this required the united assistance of the three most gifted nations of ancient times. There were three stages in the history of the alphabet. Man began first with what are termed ideograms, which represented events or thoughts ; next with phonograms or pictures, which represented words or syllables, and then came the letters of the alphabet which represented pure sounds. The picture system was very cumbersome. In the Chinese language there were 664 signs, 450 being phonetics, and 214 determinations. They represented 80,000 separate syllables, so that, if the system were adopted for the English language, 100,000 separate and different pictures would be required. The great obstacle to forming an alphabet, that of getting the consonant, could not be overcome by the Egyptians, and so matters remained for 3,000 years, when it was discovered by a Semitic nation. That was a great advance, but the next was not made for another 1,000 years, when the Greeks discovered the vowel. Thus the syllable had been discovered by the Egyptians, the consonant by the Semites, and the vowel by the Greeks, and on their labours the alphabets now in use,

more than 100 in number, had been constructed. The English letter came direct from the Latin, which had been obtained from the Greek and Phenician. The English printing letters were the same as those used for writing purposes when printing was invented, and the Lecturer shewed by some beautiful diagrams the gradual advances which had taken place in former periods.

After some remarks by the President on the deeply interesting and instructive Lecture with which the Society had been favoured by Mr. Taylor, a vote of thanks to the Lecturer, moved by Sir Henry Cooper, and seconded by Mr. J. L. Jacobs, was carried by acclamation, and the Meeting adjourned.

MEETING, 19TH APRIL, 1877.

The President in the chair.

The Rev. Samuel Houghton, M.D., Fellow of Trinity College, Dublin, delivered a lecture on "The Laws which regulate Muscular Work and Fatigue."

The Lecturer presented, in a brief and lucid manner, a number of the most interesting facts relating to the action of the muscles of men and other animals—facts such as he said were not well known to the general reader, although more or less familiar to those who had devoted themselves to the study of the subject. He divided his lecture into branches, explaining first the general details and mechanism which are to be found in muscular arrangements and the objects of them; and secondly, the whole animal machine, regarded as a machine for doing work, comparing it with the best made and best contrived machines of human manufacture. In conclusion, he drew or suggested a few obvious inferences from the facts adduced, remarking that in those facts they had the evidence of purpose and design, and that as long as the language of man existed the word "contrivance" and the word "contriver" would be applied to them. Logic and mathematics must ultimately govern the world. Men might put either aside for a moment and set up their own fanciful opinions instead, but the next generation would sweep them away.

and "design" and "designer," "contrivance" and "contriver" would hold their own against all the attacks which could be made against them.

The Mayor (Dr. King) moved a vote of thanks to the Lecturer, and said that the course of lectures just concluded had been the most successful in connection with the Institution, and he hoped that it would prove but the commencement of, if possible, still more useful courses. The vote of thanks was seconded by Dr. Elliott, and carried with great acclamation.

DONATIONS TO THE MUSEUM.

Presented by

- | | | |
|---|---|--|
| Mr. H. J. BODDY .. | .. | Antler of Reindeer. |
| Mr. J. RUTTER.. | .. | Specimen of Oak from Holy Trinity Church. |
| " .. | .. | Do. from Victoria Dock. |
| Mr. E. A. PEAKE .. | .. | Flower of Arenga Saccarifera. |
| Mr. ARTHUR HILL .. | .. | Chalk Nodule. |
| LITERARY and PHILOSOPHICAL Annual Report and Laws.
SOCIETY, <i>Sheffield</i> | | |
| Mr. G. V. HAYDEN, <i>Washington</i> | Geological and Geographical Survey of Colorado
and adjacent territory, U.S., 1874. | |
| ROYAL GEOGRAPHICAL SOCIETY Journal, 1875. Proceedings of the Society. | | |
| Mrs. BELL .. | .. | A Glass Case. |
| Messrs. WILSON, MACKINNON, "The Australasian" Newspaper (Continued).
and Co., <i>Melbourne</i> | | |
| Mr. THOMAS AUDAS .. | .. | Roman Encaustic Tile. |
| Mr. J. WRIGHT.. | .. | Water Jug from Jaffa. |
| Messrs. SAMPSON, LOW, MARS-
TON, & Co. | "South Australia, its History and Resources." | |
| ZOOLOGICAL SOCIETY OF LONDON Proceedings of the Society, 1876. | | |
| Mr. WM. ANDREWS .. | .. | Cast of a Saxon Charm found at Welton. |
| Master LISTER.. | .. | Skeleton of a Mouse. |
| Mr. E. A. PEAKE .. | .. | Section of the Black Poplar (<i>Populus nigra</i>) bored
by larvæ of the Hornet Clearwing Moth
(<i>Sesia apiformis</i>). |
| Dr. SAWDON .. | .. | Roman Bronzes and Pottery from Cirencester. |
| Mr. J. ETHERINGTON .. | .. | An Earthenware Mug, 150 years' old. |
| Mr. R. H. B. NICHOLSON .. | .. | Bow and Arrows. |
| Mr. E. T. SHARPE .. | .. | Emu from Australia. |
| The COMMISSIONERS OF PATENTS, Chronological and Descriptive Index of Patents
<i>Southampton Buildings</i> , granted in November and December, 1874,
<i>Holborn</i> and Abridgments of Specifications relating
to Casks and Barrels, 1875 and 1876. | | |
| GEOLOGICAL and POLYTECHNIC Proceedings of the Society.
SOCIETY of the West Riding | | |
| P. C. MURDOCK .. | .. | Casselle Nuts from Torres Straits. |
| ROYAL SWEDISH ACADEMY, Handlingen (Memoirs) &c.
<i>Stockholm</i> | | |
| Mr. J. J. CROFT .. | .. | Fragments of a Sword and Spear and Earthen-
ware found in excavating the Site of the old
Vicarage, Hull. |
| Mr. W. STEPHENSON, <i>Beverley</i> | A Wummerah or "Throw-stick" of South Aus-
tralia. | |

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- Mr. W. STEPHENSON, *Beverley* Bundle of Arrows from Polynesia.
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- LITERARY and PHILOSOPHICAL Annual Report of the Society.
SOCIETY, *Leeds*
- The YORKSHIRE SOCIETY .. Annual Report of the Society.
- Dr. K. KING A Bristled Seal (*Calocephalus Hispidus*).
- LIVERPOOL LITERARY and PHI- Annual Report of the Society.
LOSOPHICAL SOCIETY
- Mr. W. H. JONES Bronze Spear Head found near the Battery, Swine.
- Mr. DALE BROWN Ten Roman Copper Coins, found at Chester-le-
street, Durham.
- Mr. WM. FIELD Bone Butter Knife, found on excavating his pre-
mises in High-street, Hull.
- Mr. JOHN SYMONS Marble Tile, found in excavating the foundation
of the George and Dragon Hotel, George-
yard. Supposed to be a relic of the resi-
dence of Sir Wm. Knowles.
- Mr. JAMES OLDHAM A Chinese Compass.
- Captain W. HAMES Vertebrae of a Whale from the Dogger Bank.
- Mr. JOHN MURRAY, H.M.S. A Venus' Flower Basket.
Challenger
- WHITEY PHILOSOPHICAL So- Annual Report of the Society.
CIETY
- Mr. R. M. CRAVEN Crag Fossils from Orford Castle.
- ROYAL UNIVERSITY of CHRIS- "Remarkable Forms of Animal Life from the
TIANA Great Deeps of the Norwegian Coast."
.. Pflanzenwelt Norwegens.
.. Windrosen des Sudlichen Norwegens.
.. Etude sur les Mouvements de l'Atmosphere.
.. Enumeratio Insectorum Norvegicorum.
.. Norwegian Catalogue for Philadelphia Exhi-
bition, &c.

Dr.

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„ Cambridge Extension Lec- tures.....	12	15	0	
„ Science Classes	6	10	0	
		92	15	0
„ Petty Expenses and Sundries	34	14	4	
Less R. M. Craven's Donation for Saturday Afternoon Lectures...	5	5	0	
		29	9	4
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„ Subscription Library Acknowledgment ...	0	0	6	
		32	15	10
„ Gas	26	0	6	
„ Coals	15	4	6	
„ Water	2	0	0	
		43	5	0
„ Tradesmen's Accounts for Repairs, &c.....	49	9	3	
„ Income Tax, 1876, £2 10s ; 1877, £3 15s	6	5	0	
„ Fire Insurance.....	11	10	0	
„ Scott & Co., Gas Lantern for Prof. R. A. Proctor's Lecture	1	10	0	
„ Stationery, Printing and Advertising	89	19	6	
„ Printing and Advertising Gilchrist Lectures	8	18	8	
		98	18	2
„ Peases, Hoare, and Pease, Interest, &c.,	4	6	0	
„ Balance at Bank.....	256	16	11	
		£880	17	0

PHILOSOPHICAL SOCIETY.

30th April, 1877.

Cr.

RECEIPTS.		£	s.	d.
By Arrears of Subscriptions, 1875-76		2	2	0
„ Subscriptions, 1876-77—489 at 21s.	513	9	0	
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